REMARKS

Entry of the foregoing and reconsideration of the subject application, as amended, pursuant to and consistent with 37 C.F.R. Section 1.112, and in light of the remarks which follow, are respectfully requested.

Claim 18 is supported by paragraph [0033]. Claim 19 is supported by original claim 12 and paragraph [0029].

Claims 1, 2, 9-13 and 15 have been rejected under 35 U.S.C. Section 103(a) as purportedly being obvious over Watanabe et al. (hereinafter Watanabe) in view of East German Patent Application Publication DD257379A (hereinafter Bergmann). That rejection is respectfully traversed.

The present invention, as embodied in claim 1, concerns a method for reducing pests in an object or area by applying to the object or area a pest reducing effective amount of iodoacetic acid, bromoacetic acid, 2-iodoacetamide, 2-bromoacetamide, or mixtures thereof. Due to the election of species, the compound is bromoacetic acid and the pests are weeds (*Cyperus rotundus*).

The primary reference Watanabe discloses a synergistic herbicidal composition for combating the undesired vegetation of perennial weeds of Cyperaceae (*Cyprus* spp. (sedges)) and Gramineae. The composition contains as active ingredients at least one of the herbicidal compounds having contact acute phytotoxicity (compound A) and at least one of the herbicidal compounds having translocated chronic phytotoxicity (compound B). Compound A is described at column 1, lines 53-66 and includes chlorinated aliphatic acids (e.g., monochloroacetic acid). Compound B is a fluoropropionic acid. The preferred quantity by weight for monochloroacetic

acid or its salt or amide is 5 to 10 kg/10a (0.11 to 0.44 lb/a). The quantity by weight for compound B is 0.2 to 1.0 kg/10a. In the examples the composition was applied to areas where weeds were growing.

The present invention differs from Watanabe in that the present invention utilizes bromoacetic acid whereas Watanabe utilizes monochloroacetic acid.

Since the primary reference Watanabe fails to disclose monobromroacetic acid, the Examiner has been forced to rely upon the secondary reference Bergmann which discloses, according to Derwent, a synergistic herbicide containing a combination of 3,5-dibromo-4-hydroxy benzonitrile (Compound I) or 3,5-diiodo-4-hydroxy benzonitrile (Compound II) **and** (A) monochloroacetic acid (Compound III) or mono**bromo**acetic acid (Compound IV).

However, Derwent does **not** accurately describe what Bergmann actually discloses. "Monobromessigsäure" (monobromoacetic acid or bromoacetic acid) is not referred to, or listed, anywhere within Bergmann. In the original East German Patent Application Publication DD257379A, it is the compounds "Monochloressigsäure" (monochloroacetic acid) and "Monoiodessigsäure" (monoiodoacetic acid) that are referred to as compounds III and IV, respectively. No mention is ever made of "Monobromessigsäure" (monobromoacetic acid) in the original East German Patent Application Publication DD257379A. Thus Derwent is in error: the term "Monoiodessigsäure" (compound IV; monoiodoacetic acid) in the original East German Patent was **incorrectly** typed or mistranslated as "monobromoacetic acid." See the attached copy of Bergmann:

(1) top of page 1 describing Compound III ("Monochloressigsäure" (monochloroacetic acid)) and Compound IV ("Monoiodessigsäure" (monoiodoacetic acid));

(2) top of page 2 describing Compound III ("Monochloressigsäure" (monochloroacetic acid)) and Compound IV ("Monoiodessigsäure" (monoiodoacetic acid)); and

(3) Example 1 at the top of page 3 Compound III ("Monochloressigsäure" (monochloroacetic acid)) and Compound IV ("Monoiodessigsäure" (monoiodoacetic acid)).

Thus the Examiner has failed to provide a *prima facie* case of obviousness.

The claims do not stand or fall together. Claim 13 states that the pest reducing effective amount is about 40 to about 1200 pounds/acre. In contrast, Watanabe utilizes only 5 to 10 kg/10a (0.11 to **<u>0.44 lb/a</u>**) of monochloroacetic acid, and does not disclose or suggest using more than a 90-fold increase (40 pounds/0.44 pounds) of bromoacetic acid. Claim 18 states that the applying is pre-bedding, pre-transplant, pre-seed, or pre-plant; none of the references concern pre-bedding, pre-transplant, pre-seed, or pre-plant applications. Claim 19 states that the method fumigates soil; none of the prior art relied upon by the Examiner concern soil fumigation.

The remarks below are applicable to all claims and especially claims 13 and 18-19:

Applicant William Basinger (who has had several years training in the German language and in technical German translations) notes the following:

Bergmann indicates that the compounds "Monochloressigsäure (III)" (monochloroacetic acid) and "Monoiodessigsäure (IV)" (monoiodoacetic acid) are to be employed not as herbicides but rather for their "Sikkation" effect (**for desiccant effect**). "Monochloressigsäure (III)" (monochloroacetic acid) and "Monoiodessigsäure (IV)" (monoiodoacetic acid) are to be applied to the foliage of **crops** for their desiccant action in order to reduce or eliminate vegetative growth in crops (not weeds) such as potatoes ten days prior to harvest. The synergistic effect referred to in Bergmann pertains to the desiccation action observed in the treated crops, not weeds.

Reference examples of desiccants used for defoliating crops are as follows: sodium chlorate, Reglone, Liberty, etc.

Furthermore, Bergmann teaches (in example 1, table) that the compound "Monoiodessigsäure (IV)" is only half as effective (half the "synergistic" effect) at defoliating potato plants (when applied in combination with the herbicides indicated) as the "Monochloressigsäure (III)" (monochloroacetic acid) compound. According to Bergmann, "Monochloressigsäure (III)" (monochloroacetic acid) is a much better desiccant than "Monoiodessigsäure (IV)"; thus, the two compounds would not be considered interchangeable and certainly NO conclusions can be reached regarding "Monobromessigsäure" (monobromoacetic acid) which is not even disclosed in Bergmann.

Bergmann specifies that the desiccant compounds "Monochloressigsäure (III)" (monochloroacetic acid) and "Monoiodessigsäure (IV)" (monoiodoacetic acid) are to be applied in a mixture with either the selective herbicide 3,5-Dibromo-4-hydroxybenzonitrile or the selective herbicide 3,5-Diiodo-4-hydroxybenzonitrile. Bergmann does not indicate any pre-plant or soil applications of the compounds "Monochloressigsäure (III)" (monochloroacetic acid) and "Monoiodessigsäure (IV)" (monoiodoacetic acid).

The only additional use specified by Bergmann for the compounds "Monochloressigsäure (III)" (monochloroacetic acid) and "Monoiodessigsäure (IV)" (monoiodoacetic acid) is the post-plant application to harvested potatoes in order to reduce the susceptibility of the harvested potatoes from becoming infected with *Phytophthora infestans* (via desiccant action). It does not address controlling or killing *Phytophthora infestans*, just the production of a preventative environment.

Furthermore, the Examiner's requirement for election of species distracts from the actual focus of the invention which is **replacement of methyl bromide as a fumigant**:

1. Methyl bromide, the benchmark soil fumigant, is being phased out due to its significant contribution to the depletion of ozone in the upper atmosphere: "Methyl bromide has been re-confirmed as a significant ozone depleting compound by the 1994 UNEP Scientific Assessment of ozone depletion(1). In May 1995, several governments formally proposed dates for reducing use and phasing-out the fumigant the preparatory meeting of the Montreal Protocol, an agreement to protect the ozone layer." http://www.pan-uk.org/pestnews/pn28/pn28p4.htm

2. Bromoacetic acid is described in the application as a soil fumigant and the spectrum of plant pathogens and pests that bromoacetic acid is reported to control is consistent with its use as a soil fumigant and a methyl bromide replacement: "...[0030] It has been discovered that iodoacetic acid, bromoacetic acid, 2-iodoacetamide, 2-bromoacetamide, or mixtures thereof may be utilized in controlling pests such as fungi, insects, nematodes, bacteria, and weeds, for example by **fumigation of soil....**" (emphasis added)

3. The preferred application rates for bromoacetic acid, about 40 to about 1200 pounds/acre, are consistent with its use as a soil fumigant when compared with methyl bromide, the soil fumigant benchmark:

> ...[0046] At both locations, methyl bromide : chloropicrin (98:2) was shank injected with two chisels into preformed beds that were immediately covered with white on black high-density polyethylene mulch. Injection rate of MB:CP was **400 lb peir acre**. Bromoacetic acid was applied to the pre-formed bed top using a back-pack sprayer at **600 and 800 lb per acre** and beds were rototilled, reformed and covered with high-density polyethylene mulch.... (emphasis added)

4. The application methods given for applying bromoacetic acid are consistent with the methods used for applying soil fumigants such as methyl bromide:

> ...[0032] Application of iodoacetic acid, bromoacetic acid, 2-iodoacetamide, 2-bromoacetamide, or mixtures thereof in accordance with the present invention may be effected by a number of different procedures as are currently routinely employed for soil and structural treatments with, for example, **methyl bromide**. Thus, for example, the compounds may be applied to the soil by tractor mounted injectors on tynes, manually in canisters and via an existing irrigation system or as a gas through lay flat tubing; furthermore, for example, the compounds may be applied by drip irrigation, shanking in, spraylrototill, or overhead sprinklers.... (emphasis added)

5. A great effort was made in the application to describe the properties and effectiveness required against **multiple** pest and pathogen targets that a compound must possess in order to attain the status as a soil fumigant when compared to methyl bromide, the benchmark soil fumigant:

> ...[0002] **Methyl bromide is the chemical fumigant** currently utilized to **control fungi, nematodes, weeds, and insects in soil**. It is used for the production of high value agricultural crops such as strawberries, tomatoes, and peppers. In 1992, methyl bromide was implicated as an ozone-depleting compound and subsequently the production levels of methyl bromide were frozen. **Methyl bromide is targeted for a 5-year phase-out** beginning in the year 2000 and may be completely phased out by the year 2005. The agricultural producing states most affected by this phase-out are Florida and California, which produce the majority of the tomatoes, peppers, and strawberries grown in the United States. The aforementioned crops are the largest consumers of **methyl bromide for soil fumigation purposes**. As methyl bromide is phased out, current crop yields are expected to reduce by as much as forty percent due to increased pest pressure in **non-fumigated soil**. Vegetable growers are currently dependent on use of this **soil fumigant** with the greatest impact of its phase-out projected to be on U.S. fresh market and a total economic loss for vegetable production estimated to exceed $479 million. Weed control in the absence of

> methyl bromide is considered to be the area of greatest concern to growers. There currently exist a limited number of chemicals that are frequently studied as methyl bromide alternatives: 1,3-dichloropropene, chloropicrin, metham sodium, dazomet, methyl iodide, propargyl bromide, sodium azide, furfural, and Enzone (EPA, Methyl Bromide Web Page). None of these are considered to be drop-in replacements for methyl bromide based on performance, toxicity, or economics (**drop-in replacement** means that methodology, equipment, production system, etc. do not have to be changed significantly and that a comparable amount of material can be used for the same targets; i.e. **the material is applied at nearly the same rate and with the same equipment** as **methyl bromide**). None of the acceptable alternatives provide adequate weed control, particularly of nutsedge and grass weeds. Nutsedge is considered to be the world's worst weed due to its status as a competitor with more crops in more countries than any other weed. Purple nutsedge grows well in almost any soil type and over a wide range of soil pH, moisture, and elevation. This weed is a significant problem in field crops, horticultural crops, and turf. Yields of some crops can be reduced by as much as 90% as a result of competition with this weed. Plant pathogenic fungi and nematodes, particularly root-knot nematode (Meloidogyne spp.) are also targets of any **alternative fumigant....**

Some background information is relevant to the replacement of methyl bromide as a soil fumigant:

(a) "Methyl bromide (MB) is used largely as a pre-plant soil fumigant for the control of diseases [plant pathogenic fungi and bacteria], pests [nematodes and insects] and weeds, and to encourage uniform crop growth." (http://www.nre.vic.gov.au/agvic/ihd/r&d/doc-077.htm)

(b) "Component I: Preplant Soil Fumigation Alternatives

The loss of methyl bromide for soil fumigation will result in serious disease, insect, and weed problems. These problems will likely be highly variable and will depend on crop, soil type, environment, and cropping systems. Therefore, separate research efforts will be required to develop the many different management strategies necessary to cover the multiplicity of variables

that extend across crops and regions now dependent on methyl bromide. Approaches will include host plant resistance, biological control, modifications to cultural practices, alternative chemicals, and combinations of the above."

(http://www.ars.usda.gov/research/programs/programs.htm?np_code=308&docid=282&page=2)

6. The primary intended use of bromoacetic acid is as pre-plant soil fumigant; it will serve as a potential drop-in replacement for the pre-plant soil fumigant methyl bromide: "....[0003] ...(drop-in replacement means that methodology, equipment, production system, etc. do not have to be changed significantly and that a comparable amount of material can be used for the same targets; i.e., **the material is applied at nearly the same rate and with the same equipment as methyl bromide)....**"

7. A soil fumigant must control or eliminate plant pathogenic fungi, nematodes, insects, and weeds/weed seeds or tubers (known as a **"complex of pathogens"**) in field soil in order to be considered effective, economical, and as an alternative to methyl bromide: "...[0003] Methyl bromide is the chemical fumigant currently utilized to control fungi, nematodes, weeds, and insects in soil. It is used for the production of high value agricultural crops such as strawberries, tomatoes, and peppers...."

Some background information is relevant to the replacement of methyl bromide as a soil fumigant:

(a) "Component I: Preplant Soil Fumigation Alternatives

The loss of methyl bromide for soil fumigation will result in serious disease, insect, and weed problems. These problems will likely be highly variable and will depend on crop, soil type, environment, and cropping systems. Therefore, separate research efforts will be required to

develop the many different management strategies necessary to cover the multiplicity of variables that extend across crops and regions now dependent on methyl bromide. Approaches will include host plant resistance, biological control, modifications to cultural practices, alternative chemicals, and combinations of the above."

(http://www.ars.usda.gov/research/programs/programs.htm?np_code=308&docid=282&page=2)

(b) "Florida accounts for about 38% of preplant methyl bromide use in the United States. Florida fresh market tomatoes and peppers account for about 33% of the preplant methyl bromide use in the United States and about 88% of the preplant methyl bromide use in Florida. Strawberries account for an additional 8% of preplant methyl bromide use in Florida. The target pests are soilborne pathogens, especially Fusarium, Pythium, Phytophthora, and Verticillium; nematodes, especially root-knot nematodes; and weeds, especially purslanes, spurges, and nutsedges."

(http://www.ars.usda.gov/research/programs/programs.htm?np_code=308&docid=282&page=2)

8. The field use rate of a compound utilized as a soil fumigant (lbs/acre) is determined by screening it against the individual groups - plant pathogenic fungi, bacteria, nematodes, insects, and weeds/weed seed or tubers, then scaling the use rate such that it covers all the groups. The entire group being known as a **"complex of pathogens."** The end use field rate is in effect based on the pathogen or pest that the soil fumigant has the least control over. The field use rate is not set using an individual group as sole consideration. In the field test cited below, bromoacetic acid was used as a soil fumigant to control weeds, nematodes, **and** plant pathogenic fungi (*Fusarium* spp.):

> [0047] Pest control assessments: Weeds were assessed by weighing the fresh biomass of the native weed population in three meter long sub-samples per plot. Weeds were uprooted and shaken to remove residual soil from the roots and then weighed to measure weed

biomass. Weeds were then dried and reweighed. Weeds coming through the plastic and weeds coming up through the planting hole were assessed separately. Severity of root knot nematode infestations was assessed at harvest using a scale of 0-10 with 10 being a fully galled root. Plants were assessed for *Fusarium* wilt throughout the season.
[0048] Results and Discussion: Nutsedge pressure was high in both locations and weed control with bromoacetic acid at 800 lbs per acre was as effective as methyl bromide for both fresh and dry weight of weeds emerging both through the plant hole and through the plastic (see Table 1). Nutsedge was the only weed emerging through the plastic. Weeds found in the planting hole were diverse. The 600 lb per acre rate was as effective as methyl bromide for controlling nutsedge emerging through the plastic, but not as effective against weeds in the plant hole. The 800 lb rate was as effective as methyl bromide in controlling nutsedge coming through the plastic and all weeds emerging in the plant hole. The nematode population was not evenly distributed at either test location and root galling at both locations was highly variable. Although some control from bromoacetic acid was apparent, it was not statistically significantly different from the untreated check. The number of Fusarium infested plants throughout the growing season was small in both locations and in all of the treatments, and the percentage of dead plants was not significantly different ($P<0.05$) among any treatments. The data regarding the Fusarium and nematode infested plants is considered insignificant due to the small populations of Fusarium and nematode infected plants in the locations treated. Bromoacetic acid was highly effective for weed control and shows promise for control of other pests in the absence of methyl bromide.

9. The benchmark field use rate for soil fumigants is 350-400 lbs per acre (based on the benchmark fumigant methyl bromide): ...[0033] For example, the compounds [bromoacetic acid] may be applied at the rate of 10-1200 pounds/acre, preferably 100-400 pounds/acre; applications of the compounds at rates substantially in excess of 1200 pounds/acre would not be expected to provide any significant advantage over applications within the ranges specified....."

Thus the Examiner's requirement for election of species has distracted from the actual focus of the invention which is **replacement of methyl bromide as a fumigant.**

Withdrawal of the rejection of the claims under 35 U.S.C. Section 103(a) is respectfully requested in view of the above.

In view of the foregoing, further and favorable action in the form of a Notice of Allowance is believed to be next in order, and such action is earnestly solicited.

Please charge any required fees pertaining to this Amendment to the Deposit Account of the undersigned, No. 50-2134, and credit any overpayment to said Account.

Respectfully submitted,

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